AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A polypeptide having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z ~~derived from domain B of staphylococcal protein A (SPA)~~, as set forth in SEQ ID NO:1, having from 1 to about 20 substitution mutations thereon.

2. (Previously Presented) A polypeptide according to claim 1, which has a binding affinity for HER2 such that the K_D value of the interaction is at most 1×10^{-6} M.

3. (Previously Presented) A polypeptide according to claim 2, which has a binding affinity for HER2 such that the K_D value of the interaction is at most 1×10^{-7} M.

4. (Canceled).

5. (Previously Presented) A polypeptide according to claim 1, comprising from 4 to about 20 substitution mutations.

6. (Previously Presented) A polypeptide according to claim 1, comprising substitution mutations at one or more of the positions 13, 14, 28, 32 and 35.

7. (Previously Presented) A polypeptide according to claim 6, additionally comprising substitution mutations at one or more of the positions 9, 10, 11, 17, 18, 24, 25 and 27.

8. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 13 from phenylalanine to tyrosine.

9. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 14 from tyrosine to tryptophan.

10. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 28 from asparagine to an amino acid residue selected from arginine and histidine.

11. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 28 from asparagine to arginine.

12. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 32 from glutamine to arginine.

13. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 35 from lysine to tyrosine.

14. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 10 from glutamine to arginine.

15. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 11 from asparagine to threonine.

16. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 17 from leucine to valine.

17. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 27 from arginine to an amino acid residue selected from lysine and serine.

18. (Previously Presented) A polypeptide according to claim 1, comprising at least the following mutations: F13Y, Y14W, N28R, Q32R and K35Y.

19. (Previously Presented) A polypeptide according to claim 1, the amino acid sequence of which is selected from the group consisting of SEQ ID NO:2-79.

20. (Previously Presented) A polypeptide according to claim 19, the amino acid sequence of which is selected from the group consisting of SEQ ID NO:2-3.

21. (Currently amended) A polypeptide according to claim 1, in which at least one of the asparagine residues present in the protein Z ~~derived from domain B of staphylococcal protein A (SPA)~~ has been replaced with another amino acid residue.

22. (Previously Presented) A polypeptide according to claim 21, comprising substitution mutations at at least one position chosen from N3, N6, N11, N21, N23, N28, N43 and N52.

23. (Previously Presented) A polypeptide according to claim 22, comprising at least one of the following mutations: N3A, N6A, N6D, N11S, N23T, N28A and N43E.

24. (Previously Presented) A polypeptide, which constitutes a fragment of a polypeptide according to claim 1, which fragment retains binding affinity for HER2.

25. (Previously Presented) A polypeptide according to claim 1, which comprises additional amino acid residues at either terminal.

26. (Previously Presented) A polypeptide according to claim 25, in which the additional amino acid residues comprise a cysteine residue at the N- or C-terminal of the polypeptide.

27. (Previously Presented) A polypeptide according to claim 25, in which the additional amino acid residues comprise a tag,

preferably chosen from a hexahistidinyl tag, a myc tag and a flag tag.

28. (Currently Amended) A polypeptide according to claim 25, in which the additional amino acid residues comprise at least one functional polypeptide domain, so that the polypeptide is a fusion polypeptide between a first moiety, consisting of ~~the polypeptide according to claim 1~~ a polypeptide having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from 1 to about 20 substitution mutations thereon, and at least one further moiety.

29. (Previously Presented) A polypeptide according to claim 28, in which the further moiety consists of one or more polypeptide(s) ~~according to claim 1~~ having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from 1 to about 20 substitution mutations thereon, making the polypeptide a multimer of HER2 binding polypeptides ~~according to claim 1~~, the sequences of which may be the same or different.

preferably chosen from a hexahistidinyl tag, a myc tag and a flag tag.

28. (Currently Amended) A polypeptide according to claim 25, in which the additional amino acid residues comprise at least one functional polypeptide domain, so that the polypeptide is a fusion polypeptide between a first moiety, consisting of ~~the polypeptide according to claim 1~~ a polypeptide having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from 1 to about 20 substitution mutations thereon, and at least one further moiety.

29. (Previously Presented) A polypeptide according to claim 28, in which the further moiety consists of one or more polypeptide(s) ~~according to claim 1~~ having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from 1 to about 20 substitution mutations thereon, making the polypeptide a multimer of HER2 binding polypeptides ~~according to claim 1~~, the sequences of which may be the same or different.

35. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is capable of enzymatic action.

36. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is capable of fluorescent action.

37. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is a phage coat protein.

38. (Previously Presented) A polypeptide according to claim 1, which further comprises a label group.

39. (Previously Presented) A polypeptide according to claim 38, in which the label group is selected from the group consisting of fluorescent labels, biotin and radioactive labels.

40. (Previously Presented) A polypeptide according to claim 1, coupled to a substance having an activity against cells overexpressing HER2.

41. (Previously Presented) A polypeptide according to claim 40, in which said substance having an activity against cells overexpressing HER2 is selected from the group consisting of cytotoxic agents, radioactive agents, enzymes for antibody-directed enzyme prodrug therapy applications (ADEPT), cytokines and procoagulant factors.

42. (Cancelled).

43. (Cancelled).

44. (Cancelled).

45. (Canceled).

46. (Canceled).

47. (Previously Presented) A method of treatment of at least one form of cancer characterized by overexpression of HER2, which method comprises administering to a subject in need of such treatment a therapeutically effective amount of a composition, which comprises a polypeptide according to claim 1 as an active substance.

48. (Canceled).

49. (Previously Presented) A method of directing a substance having an anti-cancer activity to cells overexpressing HER2 *in vivo*, which method comprises administering a conjugate of said substance and a polypeptide according to claim 1 to a subject.

50. (Canceled).

51. (Canceled).

52. (Previously Presented) A method of detection of HER2 in a sample comprising the steps: (i) providing a sample to be tested, (ii) applying a polypeptide according to claim 1 to the sample under conditions such that binding of the polypeptide to any HER2 present in the sample is enabled, (iii) removing non-bound polypeptide, and (iv) detecting bound polypeptide.

53. (Previously Presented) A method according to claim 52, in which the sample is a biological fluid sample, preferably a human blood plasma sample.

54. (Previously Presented) A method according to claim 52, in which the sample is a tissue sample.

55. (Cancelled).

56. (Previously Presented) A kit for *in vivo* diagnosis of HER2 overexpression, which kit comprises a polypeptide according to claim 1 labeled with a chelator, a diagnostic radioactive isotope, and reagents for the analysis of the incorporation efficiency.

57. (Canceled).

58. (Previously Presented) The method according to claim 54, wherein the sample is a human tissue sample.

59. (Previously Presented) The method according to claim 54, wherein the sample is a biopsy sample from a human suffering from cancer.